# Engineering for Elderly Mobility Best Practices Michigan

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# **Traffic Signs**

# Increase Sign Conspicuity

### **Bigger Street Name Signs**

Widely used:

Rochester Hills Auburn Hills Wyoming



# Internally Lit Street Name Signs



#### **City of Detroit - Street Name Signs**



### **Internally Lit Case Signs**



# Reflective Sheeting on sign supports





#### **Ingham County, MI:**

- 2-way to 4-way Stop conversions
- remove sheeting after two years

# Provide Advance Information

#### **Advance Lane Assignment**

Lansing, MI



Ground-mounted signs & markings

### Advance Lane Assignment



**Overhead signs** 

# **Advance Destination Signs**



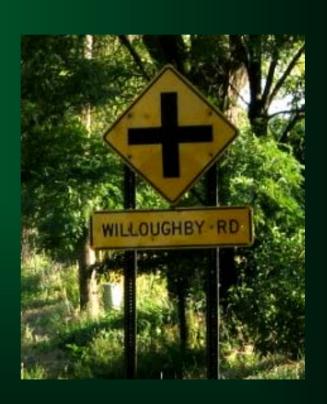
### **Advance Street Name Signs**



**Rural - MDOT statewide** 

# Advance Street Name - supplemental plaques





Ingham County, MI - all roads, 1980+

### **Cross Traffic Does Not Stop**

Use of supplemental warning sign for two-way stopcontrolled sites,

based on: crash experience, restricted sight distance, change in control





Troy

# Markings

# Make a Line that Works on a Wet Night

#### **Raised Pavement Markers**



**Farmington Hills:** 

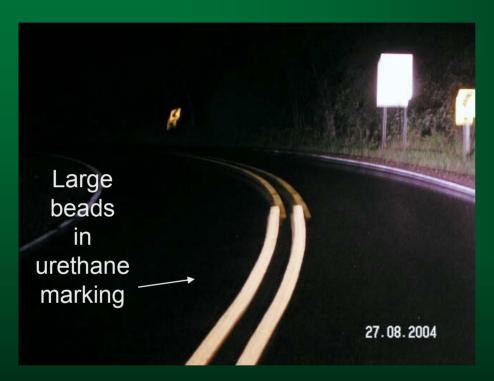
**RPMs on all Major Roads** 

# Painting the rumbles: freeway



Michigan pilot: 100+ freeway miles

#### **Over-sized Glass Beads**

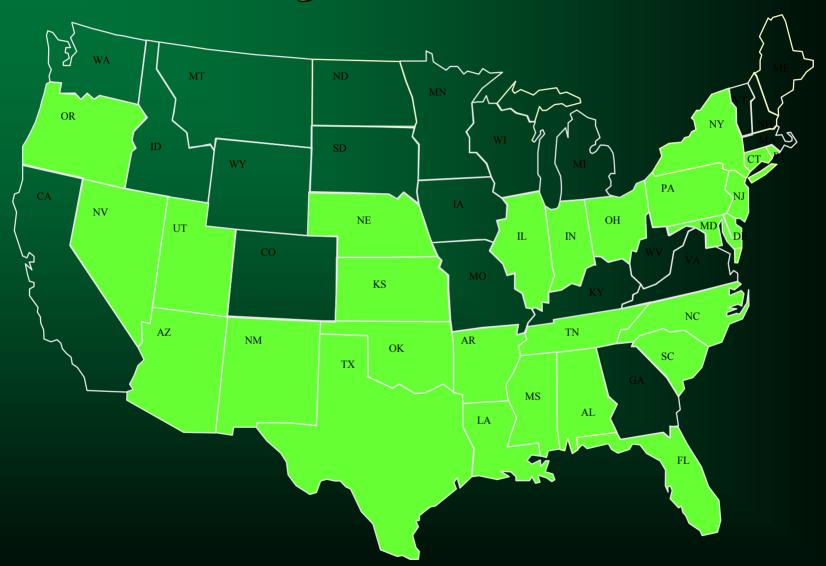




MI Counties are experimenting:

Otsego, Mackinaw, Schoolcraft, Wexford...

#### Large Bead STATES



# Add Lines to Help Guide the Motorist

# Edge line provided in parking areas





# Pavement Marking Extension – Edge Line



**MDOT** – all exit ramps

# Pavement Marking Extension – Intersection



**Common use at large intersections - many MI agencies** 







#### **Give Advance Notice**

### **Lane Drop Marking**



# **Signals**

# Make Signals More Conspicuous

#### **12" lens**



#### **Recent conversions:**

- Lansing
- Detroit (on-going)
- Grand Rapids
- Port Huron

•

Michigan MUTCD now requires 12" for new signals



## LED signals



#### Michigan users:

- Oakland County
- MDOT
- •
- •

#### **Back Plates**



Washtenaw County:
Back plates on all mast arms
(25 intersections)



Detroit:
Interested in reflectorized
yellow back plates

#### Daytime Signal - Conspicuity



Lansing:

black face yellow heads



**Traditional MI practice:** 

yellow face yellow heads

# Place Signal Heads Where Motorists Will See Them

### One Signal Face per Lane

centered over each lane



**Grand Rapids, MI** 

### Far-side Signals:

**BOX SPAN** 



#### **Moving to Box Span:**

- Port Huron
- Oakland
- Grand Rapids
- Lansing,



### Far-side Signals:

#### **MAST ARM**



Washtenaw County
25 of 75 intersections
have mast arms

Wyoming - converts 2 intersections/ yr

### Supplemental Signal Heads



Common use: Oakland, Macomb, Troy, Detroit

### **Temporary Traffic Signals**



Michigan DOT - two signals overhead

## Signal Operation

### All-Red



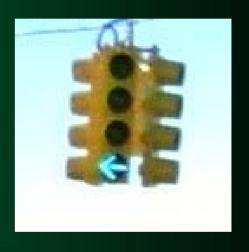
MDOT and most MI agencies have adopted ITE all-red standard

### Flashing Yellow Arrow

for permissive left turn



permissive



protected

Livingston County: new standard for permissive signals

## Design / Operational Improvements

## Anything you do to simplify the operation of an intersection,

particularly the demands on left turn traffic,

is an elderly mobility countermeasure.

### Intersection improvements



Woodward Ave. corridor- Detroit

- reposition signal heads
- 12" signal heads
- add supplemental signals
- add all-red

33 locations

Total Crash Reductions by Age

25-64 17%65+ 31%

Injury Crash Reductions by Age

25-64 4% 65+ 35%

### **Add Left-turn Phasing**



13 intersections where left-turn phasing was added:

Total Crash Reduction
Head-On Left Turn
by Age

25-64 66%65+ 73%

## Simplify the Turning Movement

#### Separate the right turn traffic



Right turn taper

Wide shoulder

Michigan DOT Muskegon TSC

Wide shoulder allows drivers to exit mainline, then slow and make easy turn

#### 4-lane to 3-lane conversions



Other Michigan agencies:

- E. Lansing
- Lansing
- who else

**MDOT:** converted xx corridors since 1995

total crashes xx %

injury crashesyy %

## Improve Sight Distance for Left Turns



## Offset Left Turn Lanes

Using the median



#### Offset Left Turn Lanes





Non-median - Livingston County, Wyoming

#### Offset right turn lane

M-43 & M-52

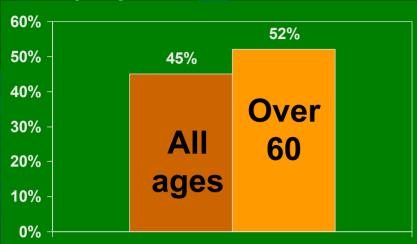


#### **Benefits to crossroad LT traffic:**

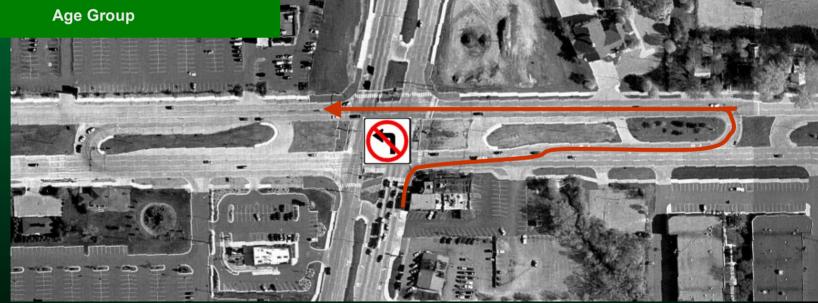
- sight distance
- level of comfort

## Remove / Relocate the Left Turn

#### **Injury crash reduction**



Michigan Indirect Left Turn



Michigan DOT - common practice on boulevards

#### Crossover design makes a difference

**AFTER:** 

**Directional flow** 

Injury crash reduction

38 %

32 %

Drivers
Over
65

**Age Group** 

BEFORE:

Bi-directional



## Michigan Indirect Left Turn – narrow median



Oakland County, Grand Rapids / Kent County

## Roundabouts Eliminate Left-turn Head on Crashes



## **RR Crossings**

#### Larger & Brighter Lights



OLD - 8" lens



NEW - 12" lens LED

**Michigan DOT** 

## Conspicuous crossing surface for high volume crossings



OLD - rubber



**NEW** - concrete

Michigan DOT practice (1998):

- cheaper by 50% & RRs love it

#### Crossbuck Conspicuity



**OLD** 



#### **NEW**

- high-intensity sheeting
- sheeting on post
- sheeting on back of X-buck and back of posts

#### **Michigan DOT**

## Pedestrian Accommodation at RR Crosssing





**OLD** NEW

#### Michigan DOT RR crossing policy:

include sidewalk crossing as part of the project

## Pedestrian Accommodation

#### **Countdown Pedestrian Signals**



Get pics – Fernadale, Birmingham, Grand Rap

Birmingham

#### Shorter & safer path



